

DOCUMENT RESUME

ED 046 212

EC 031 593

AUTHOR Strum, Irene S.
 TITLE The Relationship of Creativity and Academic Risk-Taking among Fifth Graders. Final Report.
 INSTITUTION Fordham Univ., Bronx, N.Y.
 SPONS AGENCY Office of Education (DHEW), Washington, D.C. Bureau of Research.
 BUREAU NO PR-2-R-141
 PUB DATE Feb 71
 GRANT OEG-2-70-0006(50%)
 NOTE 54p.
 EDPS PRICE MF-\$0.65 HC-\$3.20
 DESCRIPTORS Behavior Patterns, *Creative Ability, *Creativity Research, Intelligence Differences, Personality, Psychological Characteristics, *Risk, Sex Differences

ABSTRACT

The relationship between two personality characteristics, creativity and risk-taking, was investigated in fifth grade students, ages 9-11 years (N equals 291). Creativity was explored by examining the factors of ideational fluency, spontaneous flexibility, originality, and elaboration. Risk-taking, studied in a classroom testing situation, was regarded as academic in nature. The relationship between the two traits was studied in terms of magnitude, direction, and differences between boys and girls. The two standardized tests employed were the Torrance Tests of Creative Thinking, Figural, Form 1 and the SRA Tests of General Ability (TOGA). The Wide Range Vocabulary Test by Atwell and Wells was modified to measure academic risk-taking. Analyses of variance showed no significant relationship between academic risk-taking and sex or general mental ability, and none between creative thinking ability and risk-taking among the boys, the girls, or the total sample. Results were similar for each of the creativity factors studied as well as for the total creativity score. It was concluded that students who guess and take chances are not necessarily more creative than students who do not. (Author/KW)

ED046212

FINAL REPORT
Project No. 9-B-141
Grant No. OEG-2-70-0006(509)

BL 9-B-141
Approved 10/71
[Signature]
Dr. John Sokol
Director, Educational Research
DHEW-OFFICE OF EDUCATION - RM 1013
Federal Building
26 Federal Plaza
New York, New York 10007

THE RELATIONSHIP OF CREATIVITY AND ACADEMIC
RISK-TAKING AMONG FIFTH GRADERS

Irene S. Strum
Fordham University
New York, N. Y. 10023

February 1971

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

Final Report

Project No. 9-B-141
Grant No. OEG-2-70-0006(509)

The Relationship of Creativity and Academic
Risk-Taking Among Fifth Graders

Irene S. Strum

Fordham University

New York, New York

February 1971

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE
PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS
STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION
POSITION OR POLICY.

TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION.	1
Statement of the Problem	2
Definition of Terms	3
Significance of the Problem	7
Limitations of the Study.	8
II. REVIEW OF RELATED LITERATURE.	9
Measurement of Risk-Taking.	11
Creativity and Risk-Taking.	16
III. THE SUBJECTS, MATERIALS, AND PROCEDURES	21
The Subjects.	21
The Materials	22
Procedures.	27
Statistical Methods	29
IV. ANALYSIS OF THE RESULTS OF THE INVESTIGATION.	30
Academic Risk-Taking.	30
Creativity Factors and Academic Risk-Taking	31
Discussion.	37
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	39
Summary	39
Conclusions	40
Recommendations	41
BIBLIOGRAPHY	42

LIST OF TABLES

TABLES	PAGE
1. Means and Standard Deviations of Risk-taking Scores . .	31
2. Source Table: Academic Risk-taking X Sex X IQ.	31
3. Originality: Means and Standard Deviations	32
4. Source Table: Originality X Academic Risk-taking . . .	33
5. Fluency: Means and Standard Deviations	33
6. Source Table: Fluency X Academic Risk-taking	34
7. Flexibility: Means and Standard Deviations	34
8. Source Table: Flexibility X Academic Risk-taking . . .	35
9. Elaboration: Means and Standard Deviations	35
10. Source Table: Elaboration X Academic Risk-taking . . .	36
11. Total Creativity: Means.	36
12. Source Table: Total Creativity X Academic Risk-taking.	37

CHAPTER I

Introduction

For at least thirty years educational psychologists and researchers have been studying creativity, a trait, separate and distinct from intelligence, that plays a major role in the learning process. Although they disagree on the precise nature, measurement, and attainment of creativity, they agree that such a trait exists in human beings (Eisner, 1963; Golann, 1963) and is of great importance in the education of children (Taylor, 1964a, 1964b; Torrance, 1964, 1965; Kubie, 1967; MacKinnon, 1967).

In the last ten years, creativity has been increasingly referred to as a trait separate and distinct from intelligence. In 1962, Getzels and Jackson demonstrated that individuals, in this case adolescents, who have high intelligence are not necessarily highly creative. Their findings were substantiated to a large extent in eight partial replications of that study by Torrance (1962). Using other methods, Torrance (1964) found that the creative child equalled the intelligent in achievement but was also characterized as original, naughty, playful, and possessing a sense of humor. Wallach and Kogan (1965) in a study of fifth graders in a suburban public school system, found what they called a mode of thinking that was pervasive and independent of intelligence.

The term "creativity," in many descriptive definitions, encompasses the concepts of adventurousness, extensionality or openness to experience, and growth as opposed to safety (Maslow, 1956; Rogers, 1959; Getzels & Jackson, 1962; Steinberg, 1967). Researchers (Stein, 1953; Guilford, 1959; Rogers, 1959; Messick & Hills, 1960;

Barron, 1963b; Eisner, 1963) have indicated that one of the traits contributing to creativity is impulsivity. In addition, Barron (1963b) referred to the daring quality of creative individuals and Crutchfield (1962) to their independence of thought. Getzels and Jackson (1962), in their analysis of convergent and divergent thinking, indicated that convergent thinking favored certainty while divergent thinking favored risk. Moreover, they alluded to the idea that risk may be a concomitant of creativity. Torrance (1962) suggested that highly creative persons may be differentiated from others by adventurousness and a willingness to take risks. McClelland (1963) also hypothesized that creative persons would take calculated and long-range risks.

In the light of the many suggestions concerning a possible association between the two characteristics, it was felt that an investigation of the relationship between creative thinking ability or creativity and risk-taking would cast some light on the learning process. In its direct study of the relationship between the two characteristics, this investigation represents an attempt to delve more deeply into this aspect of the learning style of children than previous studies in the field.

Statement of the Problem

The purpose of this study was to investigate the relationship between two personality characteristics, creativity and risk-taking, in fifth grade boys and girls between nine and eleven years of age.

Creativity was explored by examining the factors of ideational fluency, spontaneous flexibility, originality, and elaboration. Risk-taking was studied in a classroom testing situation and was therefore

looked upon as academic in nature. The relationship between these two traits was investigated in terms of magnitude, direction, and differences between boys and girls.

Specifically, the study was directed toward answering six questions:

1. What was the relationship between creativity and academic risk-taking in fifth grade pupils?
2. What was the relationship between ideational fluency and academic risk-taking in fifth grade pupils?
3. What was the relationship between spontaneous flexibility and academic risk-taking in fifth grade pupils?
4. What was the relationship between originality and academic risk-taking in fifth grade pupils?
5. What was the relationship between elaboration and academic risk-taking in fifth grade pupils?
6. Was academic risk-taking a function of general mental ability and/or sex in fifth grade pupils?

Definition of Terms

Creativity. Creativity is defined by many researchers as a process or as an ability with emphasis on the product of creativity, its measurement, the personality of the creative individual, or the environment in which the creative process is undertaken (Mooney, 1962; Stein, 1962; Golann, 1963; Gaier, 1967), the particular emphasis determining the method of studying creativity. Researchers utilizing a product approach have generally analysed creativity through factors or traits. Guilford designed a particular test to analyze each factor, whereas Torrance used one test to study several

factors. Researchers emphasizing the personality of the creative individual have used self-descriptions, descriptions by others, life history material, etc. (Barron, 1952).

For this investigation, Torrance's definition of creativity was used. Torrance (1965, 1966b) defined creativity as the "process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies." The process does not end with the realization of a general problem by the individual, but this realization is combined with "identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies; testing or retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results." This definition emphasizes creativity as a process and the role of thinking in that process. Although some critics have indicated that this definition is the same as that for thinking in general, Torrance (1968) has responded that abilities common to both thinking and creativity are predominant in the latter and are found to a much lesser extent in other kinds of problem solving. Inherent in the definition is the idea of novelty or originality, quantity, constructive change, and purposefulness or appropriateness. A more concise definition including these ideas defines creativity as the capacity to avoid conventional ways of thinking and doing and to produce a quantity of ideas and/or products which are workable. It must be purposeful or goal directed (Piers, Daniels, & Quackenbush, 1960). In addition to the aspects of person, process, and product, Torrance (1965) also included "press," the environment, as a vital factor in the study of creativity. In taking this point of view,

Torrance elaborated on Rogers' (1959) definition of the creative process as the emergence of a new and relational product emanating from the uniqueness of the individual and the materials, events, people, or circumstances of his life. Creativity, according to Torrance, is measured by several indices derived from specimens of creative work.

This definition, then, includes the major features of other definitions of creative ability or behavior, such as Guilford's "divergent thinking" (1957), Bartlett's "adventurous thinking" (1958), Getzels and Jackson's "discovering" (1962), Stein's "novelty" (1962), and Simpson's idea of "getting away from usual thought patterns" (1922). It also contains within it ideas expressed by other researchers -- that the unique character or unusualness of the product need also be appropriate (Piers et al., 1960; Jackson & Messick, 1965); that the product be not only novel and adaptive but that it meet the need of realization (MacKinnon, 1962); that the creative process be both inner directed and environmentally motivated (Rogers, 1959; Stein, 1962). The major difference in Torrance's formulation is the inclusion of many kinds of behavior and abilities which cannot be represented by a single index.

At present, Torrance uses four scores, representing factors originally named by Thurstone (1938) and Guilford and his associates (1957), to describe an individual's creativity. These are elaboration, flexibility, fluency, and originality.

Elaboration. Elaboration involves the building up of a basic idea to make it more interesting, to tell a story, to complete it (Torrance, 1962); it is the facility for adding details to what has

already been produced (Guilford, 1967b).

Flexibility. Flexibility involves giving a variety of response to a stimulus; it is the ability to vary adaptive responses to a given task. There are two flexibility factors, spontaneous flexibility and adaptive flexibility. Spontaneous flexibility is the ability to produce a diversity of ideas, free from inertia and perseveration in a relatively unstructured situation. Adaptive flexibility is the ability to change one's mental set and therefore not persist in an activity in a wrong direction (Guilford, 1959; Torrance, 1962).

Fluency. Guilford (1967b) has described fluency as the facility an individual has for retrieving information from storage; emphasis is placed on retrieval and the use of information rather than upon memory. There are four factors subsumed under the general concept of fluency. In this investigation, ideational fluency, the production of ideas, was studied in order to measure fluency. The other three factors are word fluency, the production of words containing a specified letter or letter combination; associational fluency, the production of synonyms; and expressional fluency, the production of phrases and sentences (Guilford, 1959; Torrance, 1962).

Originality. Originality involves uniqueness; i.e., making a response that few people make (Guilford, 1959; Torrance, 1962). This factor may be most critical in creativity measurement (Stein, 1962; Guilford, 1967a); in fact, Guilford (1967a, 1967b) has suggested that creativity may be directly proportional to novelty and that novelty is the "sine qua non" of creativity.

Risk-taking. Risk-taking is the tendency to guess even when

there is a penalty. Cronbach (1946) described it as a tendency for taking chances, Ziller (1957) and Slovic (1962) as utility for risk or risk-taking propensity.

In this study, risk-taking was further delimited by studying it in an academic setting. Thus, for the purpose of this investigation, academic risk-taking was defined as the tendency to guess in a classroom situation (on a test), even when there was a penalty.

Significance of the Problem

Current interest in creativity is not merely academic. During the last twenty years, research has been conducted to identify and measure creativity as an independent personality trait. Other information about creative thinking ability has been largely in the area of assumption, postulate, hypothesis, and theory. For example, Torrance (1964) and Kubie (1967) maintain that mental health, emotional stability, vocational success, and social importance can be attained through creative thinking processes. In order to increase knowledge and understanding of creativity, empirical information on the nature of creative thinking ability must be collected. Investigations into the nature of creativity are, therefore, essential. Specifically two questions that have yet to be answered are: 1. How is creativity manifested? 2. What are the correlates of creative thinking ability?

Since it is apparent that creativity cannot be measured directly, it is essential that teachers know what its characteristics are as it may be evidenced through measurement of children's attitudes, values, and through observation of their behavior. In this way, teachers will be able to develop teaching styles that will foster creativity in their pupils. They cannot adjust their teaching styles to meet this need

unless they can recognize creative thinking ability. The necessity for ascertaining creative thinking ability through its expression as a more easily measured personality trait or as overt behavior demands further investigation. This study is directed to the exploration of risk-taking, easily measured in the classroom, as a correlate of the behavior of creative individuals. As such, the knowledge that is gained should help teachers to foster creativity and thereby provide for optimal learning.

Limitations of the Study

This study has been limited in scope in terms of the number of subjects, their location in a middle class community, and the fact that only one grade in the elementary school had been selected for investigation. There is a lack of generalizability to all children.

Satisfactory reliability and validity have not yet been clearly established for the instruments used for the measurement of each trait. However, no other instrument has as yet been developed that is superior to those used here.

CHAPTER II

Review of Related Literature

Extensive literature has been compiled concerning creativity and its measurement; only some highlights will be commented on here. Many studies have focused on the controversy concerning the independence of creativity and intelligence. Getzels and Jackson (1962) and Wallach and Kogan (1965) demonstrated empirically that differences existed between the two traits; their research supported earlier investigators and theorists including Colvin (1902), Simpson (1922), Thurstone (1938), and Guilford (1950), all of whom had pointed to the existence of a quality unmeasured by general mental ability tests. Torrance's (1962) experimental examination of the creativity-intelligence issue as well as investigations by other researchers tended to uphold the findings that the two traits were indeed separate and distinct.

Considerable effort has been devoted to a search for an explanation of the obtained variations in correlations between creativity and intelligence, since their magnitude has varied so greatly at different levels of intelligence. Taylor and Holland (1962) concluded that intelligence as currently measured accounts for only a small part of creativity and therefore cannot by itself measure an individual's creative thinking ability. The Barron hypothesis that creativity correlates with intelligence at lower IQ levels was not supported in several studies (Ripple & May, 1962; Allen, Dacey, & Madaus, 1969). McNemar (1964) refused to consider creativity as an independent characteristic that could be used meaningfully in psychological testing. He concluded that variations in correlations between creativity and intelligence were due to statistical

manipulations. Jackson and Messick (1965) suggested that when a creative response is also useful and "good", then creativity and intelligence are identical; this phenomenon of the intersection of creative thinking ability and intelligence at the higher levels of each was explained by Price and Bell (1965) as resulting from the ability of highly intelligent individuals to express their creativity meaningfully. Reviewing the segment of empirical literature that included utilization of his battery, Torrance (1968) found that there were some consistent, small, positive relationships between intelligence and creativity that were higher for girls and for the lower quarter of the IQ continuum. Tabulations of correlation coefficients reported by these investigators revealed positive correlations for IQ and total (figural and verbal) creativity and IQ and creativity scores resulting from the verbal battery; few positive correlations were reported in studies of the figural battery. As a result of the controversy, Golann (1968) called for a conceptual reorganization of both characteristics.

Creativity research among elementary school children has generally involved an instrument designed by or based upon the theoretical constructs of Thurstone (1938), Guilford (1957), and Torrance (1962, 1965); thus, the measurement of creative thinking ability in children has concentrated, on the whole, on the factors of originality, fluency, flexibility, and elaboration. Theorists, however, have not limited themselves to these factors. Tolerance of ambiguity has been cited both descriptively (Stein, 1953; Rogers, 1959; Barron, 1963a) and empirically (Guilford, 1959; Messick & Hills, 1960; Merrifield, Guilford, Christensen, & Frick, 1961) as a characteristic of the

creative individual. Furthermore, Barron (1963a) hypothesized that creative individuals reserve judgment and engage in additional search for answers rather than commit themselves prematurely; this hypothesis supports the statement (Bruner, 1960) that in order to think creatively, the individual must overcome his fear of risking error. Another characteristic ascribed to creative individuals is their individualism or lack of conformity to group pressure (Yamamoto & Genovese, 1965). It would appear that all of these characteristics are related, to some extent, to risk-taking as defined in this study. Thus, the initial review of related literature suggests a tendency for creative individuals to be risk-takers.

Measurement of Risk-taking

Empirical research into risk-taking reveals that the investigation of this characteristic has evolved through a full cycle. The early researchers utilized a test situation as a measurement method; later, researchers used existing games of chance (chance situation) and designed games of skill (game situation) that served as the approach to measurement of risk-taking. Currently, the test situation has been reintroduced as a means of determining an individual's risk-taking propensity.

One of the earliest investigators of risk-taking, Swineford (1938, 1941) devised an approach that yielded an indication of an individual's "tendency to gamble." His procedure included the administration of four different kinds of tests with instructions designed to elicit risk-taking. The tests were given to 457 ninth grade students in the Mid-West. They included a manipulative geometry test, a general information test of multiple-choice questions, a multiple-choice vocabulary test, and a true-false logic test. The findings indicated that boys had higher gambling

ratings (G) than girls. Moreover, G was significantly lower on the verbal tests than on the manipulative tests leading Swineford to hypothesize that familiarity with the verbal tests resulted in less gambling. Ability in the subject area did not affect the tendency to gamble; correlations of actual test score with G varied from $-.024$ to $-.225$. Swineford also reported that the G factor obtained from a verbal test tended to be a reliable measure, largely because of the length of such tests.

Cronbach (1946) reaffirmed the reliability of a gambling score both within a particular test and from one test to another; risk-taking propensity was distributed over a continuum varying from the individual who answers only when very sure to the one who attempts every item. This trait, "caution vs. incaution," was described by Cronbach as a response set and, in this case, was defined as the tendency to guess on a doubtful test item rather than omit it.

Ziller (1957) studied risk-taking as guessing on a true-false achievement test. Test papers of 182 ROTC students at the University of Delaware were scored for incorrect and omitted responses. Then risk-taking was estimated according to the following formula: $\text{Risk} = \frac{2W}{2W+U}$ where W refers to the number wrong and U to the number omitted. It was found that there was no relationship between intelligence (ACE scores) and risk-taking ($r = .02$).

Risk-taking has also been estimated through studies utilizing ambiguous figures. Subjects are presented with incomplete figures or pictures and are required to identify them or match them with clearly recognizable samples. Wallach and Caron (1959) directed sixth grade boys and girls to choose the ambiguous figures that were similar to an

identifiable figure ("key figure"). The authors concluded that boys took more risks than girls since they were more willing to call the ambiguous figures similar to a "key figure."

Messick and Hills (1960) were concerned with procedures to measure an individual's "cautiousness" or tolerance of ambiguity, defined as the "unwillingness to reach a conclusion quickly on the basis of insufficient or minimal information [p.690]." They designed a verbal test consisting of vocabulary items and five clues or "hinting sentences" for each word. The subjects, approximately 300 high school girls, were instructed to choose the correct answer using the smallest number of clues. A non-verbal test was similarly designed using ambiguous figures as items. Both a content score, regarded as an indication of ability, and a "response-set score," the extent of an individual's "cautiousness" were obtained. In order to control the effects of content on the response-set score, a third score was derived which indicated the extent to which a subject was tolerant of ambiguity or cautious. The authors stated that "a person who is intolerant of ambiguity should quickly structure an incomplete figure, and tend to jump to a generalization about the meaning of a word from its restricted use in specific sentences [p.689]." They, therefore, concluded that the method studied permitted an investigation of cautiousness while controlling the effects of intelligence. However, their definition of cautiousness as the "unwillingness to reach a conclusion quickly on the basis of insufficient or minimal information [p. 690]" may not be lack of risk-taking at all, but rather deliberation or non-impulsivity.

Slovic (1962), using a verbal instrument, suggested that the willingness to take risks varied from one situation to another. In one

situation, subjects were given a vocabulary test consisting of forty-three multiple choice items and requested to indicate each incorrect alternative for which he would receive one point; he would lose three points for each correct alternative he marked. The second situation consisted of four self-crediting tests; first, the subject was presented with relatively simple vocabulary items and told that he would be given a test of items of similar difficulty; he was permitted to assign the point value of the questions on the test he was about to take; then he was instructed that the items on the next test would be more difficult than those he had completed and, if he desired, he could reset the point value. Low correlations of scores from the "alternatives" situation and the "self-crediting tests" situation resulted, leading to several possible conclusions; 1, risk-taking propensity may vary from one situation to another; 2, the variables analyzed under the devised testing procedures may not be measuring risk-taking.

Findings reported in other investigations (Stone, 1962; Slakter, 1967, 1969; Slakter & Koehler, 1968) suggest that Slovic was not studying risk-taking, since fairly reliable results were obtained through the use of objective tests in all of them; in fact, Slakter (1969) described risk-taking behavior as "impressively consistent [p.115]." In various studies, Slakter (1967, 1969) and Slakter and Koehler (1968) adapted objective tests in language and mathematics aptitude and achievement by adding nonsense questions and the instructions, not to guess; the proportion of nonsense questions answered was the risk-taking index. In one of these investigations (Slakter, 1969), eighth graders were given the language and mathematics sections of the Standard Educational Intelligence Test and the Standard Educational Achievement Test. Correlations of achievement and

aptitude scores, language and mathematics scores indicated that there was no difference in risk-taking behavior from one situation to another; these findings were obtained for both boys and girls. Contrary to Swineford's (1941) findings, Slakter reported a trend of high risk-taking correlating with low legitimate test scores. In addition, girls were significantly greater risk-takers than boys.

Other researchers have measured risk-taking through chance and game situations generally outside the regular school program. Chance situations frequently involved the willingness of subjects to wager on the outcome of thrown dice. Although they were always able to win money, their losses were nil, since, in each case, they were given specific amounts with which to play. Risk-taking indices were computed on the basis of the probability chosen and the amount of money wagered. In the game situation, the variable determining difficulty generally was used to estimate risk-taking; thus, frequently risk-taking was distance from a target.

Using a chance situation with young men of eighteen to thirty-eight years of age, Scodel, Ratoosh, and Minas (1959) correlated risk-taking indices with IQ scores obtained from the Wechsler Vocabulary Sub-test, Form I. They concluded that intelligence was "not related to degree of risk-taking per se but was inversely related to variability in risk-taking [p.26]."

In addition to conventional chance and game situations, Kogan and Wallach (1964) devised some new activities in order to investigate risk-taking among college students. In one approach, subjects were presented with a series of events and required to give the probability of their occurrence. In another, risk-taking was measured by the number of clues used by the subject to make a decision. No relationship was found between

risk-taking and verbal ability.

Kass (1964) studied risk-taking among six-, eight-, and ten-year-olds by means of slot machines that released pennies which were later exchanged for prizes. Each machine was programmed for a different pay-off -- $1/1$, $1/3$, $1/8$. After becoming familiar with each machine, the subjects were required to choose one of them each time he played. Risk-taking was based on response choice during the last thirty times. Using only seven subjects at each age level, it was found that boys tended to choose machines programmed for intermediate and low probabilities most frequently, whereas girls tended to choose high probability slot machines. Kass concluded that risk-taking was a function of sex, not of age. However, any conclusions were ungeneralizable due to the small number of subjects.

Slovic (1966) also utilized a slot machine for determining risk-taking in chance situations. This device consisted of ten knife switches and a buzzer which could sound automatically at any time. The subject pulled on the switches until the buzzer sounded or until he decided to stop. If he voluntarily stopped playing before the buzzer sounded, he was able to keep his prizes, spoonful of M & M candy. The study was virtually uncontrolled since it was carried out at a country fair with 1,047 children and young adults who, by volunteering to play, had already demonstrated some risk-taking propensity. Slovic found that boys took greater risks than girls at every age above eight years.

Creativity and Risk-taking

Few investigations have been undertaken to study both creativity and risk-taking. Those that have been carried out vary greatly in definition of risk-taking, instrumentation for the measurement of each

trait, and age of subjects. Under the heading of risk-taking were characteristics such as adventurousness, flexibility vs. rigidity, tolerance of ambiguity, and gambling, measured by such diverse approaches as a test, a questionnaire, or a game or chance situation. Creativity was measured by tasks based upon the works of Torrance and Guilford. Studies were conducted among children, adolescents, and adults. Criteria for selection of studies reported in this section was solely the researcher's intent to investigate the relationship of creative thinking ability and risk-taking since so few studies exist. No attempt was made to delimit them on the basis of methodology or age of subject.

During the 1950's and 1960's, Guilford and his co-workers experimented with a variety of instruments in order to identify factors in creative thinking. One of the earliest studies linking factors indicative of risk-taking with creativity was conducted by Merrifield, Guilford, Christensen, and Frick (1961). Naval and air force cadets completed a series of tests consisting of tasks designed by Guilford to measure fluency, flexibility, and originality and an inventory of non-apptitude factors. Positive significant Pearsonian correlations between associational fluency and the need for adventure (.13), ideational fluency and impulsiveness (.22), and originality and tolerance of ambiguity (.12) were obtained.

Fleming and Weintraub (1962) studied the relationship of rigidity or intolerance of ambiguity and creativity as measured by the Frenkel-Brunswik Revised California Inventory and tasks from the Torrance verbal and figural batteries, respectively, among sixty-eight gifted elementary school children. They found an inverse relationship between rigidity and verbal creativity and between rigidity and total

scores of ideational fluency, spontaneous flexibility, and to a small extent, originality. No relationships were evidenced between rigidity and non-verbal creativity, i.e., creative thinking ability as measured by the figural battery.

Long and Henderson (1965), basing their investigation on Barron's (1963) idea of creativity as a system of behavior, studied creativity as a response style in which an individual is unlikely to commit himself prematurely but will reserve judgment; thus, they hypothesized that creative individuals would not be risk-takers. Creativity was measured by Torrance's Repeated Figures Activity (parallel lines) which is the last task on Form A of the figural battery. Risk-taking was measured through opinion formation on a Children's Opinion Scale designed by Ziller and Long. In this study, only the "don't know" score was used; a low "don't know" score was equivalent to opinionated and non-creative. Both instruments were administered to approximately 300 children in second to seventh grade. Significant relationships were found between the "don't know" score and fluency, flexibility, and originality; the relationship was strongest for fluency. Long and Henderson concluded that "this ability to withstand the uncertainty of an undecided state, to resist premature closure may be an important aspect of their ability to think creatively [p.222]."

Nicolay (1966) examined risk-taking and creativity among female undergraduates by means of a questionnaire and two Guilford verbal tasks, respectively. The questionnaire had low reliability (.74) and questionable validity; the latter was determined by agreement between scores and judges' ratings. The researcher had hypothesized that risk-takers would have less creative ability than non-risk-takers. The findings did not

support this hypothesis; although non-significant, it was found that risk-takers tended to have greater creative ability than non-risk-takers.

Kurtzman (1967) studied personality traits of ninth grade girls in relation to their creativity as measured by several tests from the Kit of Reference Tests for Cognitive Factors. He found that the more highly creative girls were significantly more adventurous than the less creative, thereby leading him to conclude that the creative person is a "gambler" -- he takes a chance rather than plays it safe.

Studying the creative thinking ability and reflection-impulsivity of seven- and eight-year-old boys, Ward (1968) administered the creative procedures used earlier by Wallach and Kogan (1965), the Revised Art Scale, the Motor Inhibition Test, and the Haptic-Visual Matching Test. The latter instrument measured reflection-impulsivity. Ward hypothesized that the most impulsive boys would be among the more creative. However, he found that there was no significant relationship between creativity and reflection-impulsivity.

In an investigation of risk-taking and creativity in fifth grade boys and girls, Pankove (1967) administered two Guilford type creativity tests, one verbal and one visual, and several risk-taking instruments, of which only a miniature shuffleboard yielded a potentially useful risk-taking score. In this game situation, children were able to manipulate markers determining the distance to the goal. Risk level was obtained by averaging the distances between markers, the shorter the distance reflecting higher risk. The two other methods were "Draw a Circle" which did not work at all and "Clues" in which a subject was told that one dollar would be given to the child who correctly identified the object with the smallest number of clues; the number of clues was the risk-taking

score. All procedures were administered individually to 162 middle class suburban boys and girls. The investigator found that there was a significant relationship between risk-taking and creativity in the case of boys. For this same sample of children, Fankove and Kogan (1968) reported that there was no relationship between different risk-taking measures. Furthermore, there was a significant relationship between creativity and risk-taking for both boys and girls ($-.18$ and $-.20$, respectively) when risk-taking was measured by means of the shuffleboard game. However, when success expectancy was partialled out, the resulting partial correlations indicated that the relationship was still significant for boys ($-.24$), but not for girls ($-.15$). Intelligence and risk-taking were not generally significantly correlated. However, a significant coefficient ($-.24$) was obtained for girls when they were tested with the verbal "clues" procedure; such results may have reflected girls' superior verbal ability.

Thus, the review of related research indicated a variety of hypotheses, methods, findings, and conclusions which suggested the need for further investigation of this area. A tendency for the creative individual to be a risk-taker has been hinted at by researchers, but conclusive findings have not yet been obtained. The method utilized in this study should provide new insights on the subject of creativity and risk-taking.

CHAPTER III

The Subjects, Materials, and Procedures

The purpose of this study was to determine the relationship of creativity and academic risk-taking among fifth grade boys and girls. However, since a verbal measure was used to determine propensity to risk, it was necessary to obtain some indication of the children's verbal ability in addition to a measure of their creativity and of their propensity to risk.

The study was undertaken in a predominantly middle class suburban community in the northwestern section of Westchester County. Only recently has its rolling hills, farmlands, and wooded areas been converted to housing developments to serve the needs of commuters to the Metropolitan New York City area and of the staffs of industrial complexes in the county. In addition to private and parochial schools, there are three public elementary schools in the community. Attendance at a particular school is based upon location of residence. In 1969, there was a total of sixteen fifth grade classes at the three schools.

The subjects, materials, and procedures, and the statistical techniques used in answering the questions posed in the first chapter are described in the sections that follow.

The Subjects

The subjects of this investigation included 291 children, 143 boys and 148 girls. Eighty-nine were enrolled at one school, ninety-nine at a second school, and 103 at the third school in the district. The children ranged in age from ten to twelve, the mean age being ten and one half years. IQ's obtained through the September 1968 administration of the SRA Tests of General Ability (TOGA) ranged from 71

to 160 with a mean IQ of 112.5.

Materials

Creativity. The Torrance Tests of Creative Thinking, Figural, Form A was the instrument selected to measure the four creative thinking factors, elaboration, flexibility, fluency, and originality and to obtain a total creativity score for each child. This instrument is based on the assumption that creative ability is best measured through the study of a product involving the entire creative process (Torrance, 1962). Thus, Torrance's strategy was to design a test in which each exercise would be a complex rather than a pure factor task so that many aspects of creative thinking would be involved. An individual's answers would be examined for various qualities of creative thinking. Each activity in the test makes a unique contribution to the battery, since it involves different kinds of creative thinking. Moreover, each activity has been designed to promote adaptive responses through "regression in the service of the ego [Schafer, 1958, p.122]," a very important aspect of creative thinking (Torrance, 1962). "Regression in the service of the ego" refers to the process by which psychic free play can occur within the individual without the controlling self-evaluation that ordinarily is present during thinking processes. As a result, many more adaptive responses are possible. Each product is scored for the divergent thinking factors of fluency, flexibility, originality, and elaboration.

The test consists of three activities or tasks: In the first, Picture Construction, the subject attempts to find and achieve a purpose for the unstructured stimulus, a colored shape, with which he is presented. To do this, he must use the shape as an integral part of the

picture he is creating. Through the instructions, original pictures "that tell as complete and as interesting a story as possible [Torrance, 1966a, p.6]" are encouraged. Pictures are scored for originality, flexibility, and elaboration. In the second activity, Incomplete Figures, the tendency toward structuring and integrating is elicited by means of ten relatively unstructured figures which the subject must complete. The last task is Repeated Figures Activity; through the repetition of a single stimulus, the subject is encouraged to make as many different objects or pictures as he can, to try to make them as interesting as possible, and to try to think of things that others will not make. Each completed figure in the latter two tasks are scored for all creativity factors.

Although the test is based on Torrance's definition of creativity, its design is supported in general by writings of other researchers. Much of Torrance's conclusions are based on Thurstone's and Guilford's earlier works; these psychologists differ primarily from Torrance in that each of their tasks represents a pure factor, whereas Torrance's battery consists of complex tasks. Taylor (1964a) has supported the latter approach because of the existence of multiple factors in creative thinking ability. Wallach and Kogan (1965) agreed on the necessity for a game-like atmosphere rather than a testing environment during the administration of the instrument. De-emphasis of time as a factor in creativity, since stereotyped or relatively unoriginal ideas are assumed to precede the unique, has also been noted by researchers (Mednick, 1962; Wallach & Kogan, 1965). In the Torrance Tests of Creative Thinking, subjects have ample time to complete each exercise.

In his review of the test, Holland (1968) indicated "extensive and satisfactory [p.297]" reliability data; however, it appears likely that Holland was referring to inter- and intra-scorer reliability rather than test-retest reliability. Inter- and intra-scorer reliability have been generally high, .90 or above (Torrance, 1966b). Wodtke (1964) obtained coefficients of .91 to .99.

Test-retest reliability, on the other hand, has varied from .50 to .85 (Torrance, 1966b). In a study of fourth, fifth, and sixth graders in St. Croix, Wisconsin, it was found that after a one to two week interval, reliability coefficients varied from .71 to .85. In a study conducted with fifth graders in a suburban St. Paul, Minnesota school, correlations were somewhat lower after a similar interval. With another fifth grade group at this same school, correlations were somewhat higher after an eighth month interval (Torrance, 1966b). Wodtke (1964) reported coefficients ranging from .34 to .79 after testing 100 to 150 Salt Lake City children in each grade from second through fifth in the fall and spring. Guilford (1967b) has explained the relatively low reliability coefficients of creativity tests as resulting from the general unstable levels of creative functioning.

Despite the relatively low test-retest reliability coefficients, researchers who have used this battery have reported it useful for making group comparisons and for research purposes (Wodtke, 1964; Paulus & Renzulli, 1968).

Little empirical evidence has been presented to demonstrate validity. An "extensive rationale [Holland, 1968, p.298]" has been developed to demonstrate content validity. Test activities sample a wide range of creative thinking abilities which were selected as a

result of research on the creative process, the functioning of the human mind, and analyses of the lives of creative people (Torrance, 1966b). Torrance (1967) emphasized that test stimuli, test tasks, and scores were based on the "best theory and research" currently available. More than fifty studies have been conducted with children, adolescents, and adults in order to demonstrate construct and concurrent validity. Weisberg and Springer (1961) found that intellectually and creatively gifted pre-adolescents were rated significantly higher on the following variables than those who were equally gifted as measured by intelligence tests but not gifted creatively: strength of self-image, humor, self-awareness, unconventional responses, forceful and imaginative treatment of ink blots, independence from environmental influences, readiness for an emotional response to the environment. Also demonstrating construct validity was Fleming and Weintraub's (1962) investigation which found a negative relationship between rigidity and test scores. Torrance (1967) reported investigations by students earning masters degrees which attempted to demonstrate concurrent validity; the selection of criteria posed a major problem for these studies. Holland (1968) was critical of the designs of many of the validation studies; moreover, he found their statistical techniques deficient. Nevertheless, he concluded that they reported results "generally consistent with creative behavior literature [p.298]." Torrance (1968) reported that predictive validity studies had been undertaken and were incomplete.

Academic risk-taking. In order to measure academic risk-taking, the Wide Range Vocabulary Test by Atwell & Wells was modified and administered to the subjects. Special permission was granted by the Psychological Corporation to reproduce 45 items from Form C of this

instrument. Form C presents vocabulary of varying difficulty in alphabetical order; the test provides a quick indication of verbal ability among individuals from eight years of age to adulthood. The 45 items used in this study were selected randomly and presented in alphabetical order. The major change was the special instructions provided as motivation for risk-taking. The children read the following instructions to themselves as the investigator read them aloud:

You may choose how many points you want each question to count. You may decide to make a question count four points, three points, two points, or one point. If you decide to give a question four points and you get it right, four points will be added to your score. If you give a question two points and get it right, two points will be added to your score. Remember, if you get the question wrong, you will lose that many points. If you get a question wrong that you decided to count as a four point question, you will lose four points from your final score. Remember, you must make a choice on the number of points you want a question to count and then choose the answer you think is correct.

This type of procedure for measuring risk-taking has been found to be reliable (Swineford, 1941; Stone, 1962; Slakter, 1967, 1969, Slakter & Koehler, 1968) and unrelated to achievement in subject matter (Swineford, 1938; Slakter, 1969).

General mental ability. A general mental ability test provides primarily an indication of the individual's verbal ability. It was decided to use the test administered by the district in its yearly testing program. In the fall of 1968, the SRA Tests of General Ability (TOGA) were administered to the children. The resulting score is a summation of an information score and a score that represents the level of "noncultural reasoning [Buros, 1965, p.774]" and provides an indication of general ability, general intelligence, or a basic ability to learn. By placing less emphasis on academic skills, TOGA is supposedly fairer

to culturally deprived children than other group tests purporting to measure general mental ability. In addition, the test designers describe TOGA as a power test.

There are eight kinds of information items on TOGA: 1. recognition of an object when it is named; 2. recognition of an object from its classification; 3. recognition of an object on the basis of its similarity to another object; 4. recognition of an object in terms of its symbolic status; 5. selection of a picture that is representative of an abstract concept; 6. selection of an object based on the concept of its use; 7. selection of an object that represents the application of a principle; 8. selection of an object depicting an element basic to an idea.

In his review, Horrocks (1965) reported that TOGA has been carefully constructed and is a general measure of verbal intelligence. De-emphasis of speed, however, was not recognized as a completely positive feature since it removed one major aspect of intelligence, the ability to act under the stress of time that occurs in reality. Reliability and validity coefficients were at acceptable levels. Reliability coefficients ranged from .77 to .90. Correlations of TOGA with various measures of achievement clustered between .50 and .60 with a range of .38 to .81. Schutz (1965) commented that such proof of concurrent validity suggests a major similarity of TOGA scores with scores of other general intelligence tests and therefore may disprove the culture-fair aspect that the test designers have featured. The lack of predictive validity in the manual and no mention of the need for such studies was seen as a distinct deficit by Siegel (1961). However, he reacted favorably to TOGA on the basis of brevity, technical quality, and sound rationale.

Procedures

This investigation was conducted with the permission and assistance of the district principal of the community. Through his office, the investigator was able to secure the cooperation of the elementary school principals and teachers in order to administer two tests and obtain the scores on the third from pupil records.

During a two-week period in April 1969, the investigator administered the Torrance Tests of Creative Thinking, Figural, Form A and the modified version of the Wide Range Vocabulary Test to fifth graders in the three public elementary schools. IQ's for each student were obtained from school records.

The next step in the study was to score the two major instruments. The investigator used the special scoring techniques presented in the administrative manual (Torrance, 1966a) in order to obtain indices for the four creativity factors and total creative thinking ability. Thus, the creativity battery was scored for fluency, flexibility, originality, and elaboration. Raw scores were converted into T scores with a mean of 50 and a standard deviation of 10 (Torrance, 1966b). A total creativity score was computed by adding together the standard scores of the four factors; such a combination of scores is meaningful because the total reflects common factor variance (Ohmacht, 1966).

Academic risk-taking was scored by means of the following formula:

$$\text{Risk-taking} = \frac{\text{Errors marked "4"}}{\text{Total errors} + \frac{1}{2} \text{ omissions (within test)}} \times 100$$

(Swineford, 1938).

The rationale for using wrong questions reflects the fact that guessed items cannot be separated from real knowledge among correct questions. Thus, risk-taking is based on incorrect items, all of which may be thought of as guesses. Swineford (1938) found that even if they were not guesses,

the resulting score was not seriously affected.

Statistical Methods

The statistical procedures used in this investigation were based on techniques reported by Winer (1962) and interpreted into Fortran as suggested by Veldman (1967). An IBM 360-40 computer was utilized in processing the data.

In order to study the relationship of risk-taking, sex, and intelligence, a two-way analysis of variance was computed using academic risk-taking as the dependent variable.

The statistical technique of analysis of co-variance was selected as the method to study the relationship of academic risk-taking and creativity; this choice was necessitated by the assumption that verbal ability would affect academic risk-taking. In the analyses that were computed, the TOGA score was the co-variable. Three levels of risk-taking were identified, each level containing the same number of subjects. Each factor score of the creativity battery and a composite creativity score were dependent variables. Each analysis of co-variance was calculated for boys, girls, and the total number of subjects. Thus, fifteen analyses of co-variance were computed.

Statistical significance was accepted at the .05 level.

CHAPTER IV

Analysis of the Results of the Investigation

The problem under investigation was that of determining the relationship between creative thinking ability and academic risk-taking. The figural battery of the Torrance Tests of Creative Thinking, a risk-taking instrument, and TOGA were administered to more than 300 children.

Academic Risk-taking

When the risk-taking test had been scored, the papers were arranged into three categories, low risk-takers, average risk-takers, and high risk-takers. The determination of risk-taking group was made by dividing the total sample into three equal groups; ninety-seven children were in each group. Low risk-takers scored under eight on the risk-taking instrument, average, eight to eighteen, and high, nineteen and over. Table 1 indicates means and standard deviations of risk-taking scores for boys, girls, and the total sample.

The use of a verbal instrument to measure academic risk-taking required investigation into the relationship of these two traits. Three ability groups were formed: the low group included children with TOGA scores below 105; the middle group included children whose scores were between 105 and 119; the children in the highest group scored 120 and above. Means and standard deviations of risk-taking scores for ability groups are reported in Table 1.

The mean risk-taking score for girls was lower than that for boys. This was also observed among the two highest ability groups. Among the fifth grade boys and girls in the lowest ability group, mean risk-taking scores were virtually identical.

TABLE 1

Means and Standard Deviations of Risk-taking Scores

Group	Boys		Girls		Total	
	Mean	SD	Mean	SD	Mean	SD
High Verbal Ability	17.5	15.4	12.7	12.0	15.5	14.4
Average Verbal Ability	16.7	15.2	13.8	11.7	15.1	13.3
Low Verbal Ability	17.4	13.8	17.5	15.4	17.5	14.6
Total	17.2	14.9	14.8	13.3	16.2	14.2
N	143		148		291	

Analysis of variance was conducted to determine the relationship between academic risk-taking and sex and academic risk-taking and verbal ability. No significant differences were found between academic risk-taking and sex or ability. Moreover, the interaction between sex and ability was also non-significant. Thus, although differences in academic risk-taking were evidenced between boys and girls, these differences were apparently due to chance. These findings are reported in Table 2.

TABLE 2

Source Table:
Academic Risk-taking X Sex X IQ

Source	DF	MS	F
IQ	2	0.35	0.8
Sex	1	0.96	2.3
IQ X Sex	2	0.29	0.7
Error	285	0.42	

Creativity Factors and Academic Risk-taking

The original experimental design had called for analysis of covariance to determine the relationship of creativity factors and academic

32

risk-taking using verbal ability as the co-variable. The finding of no significance for verbal ability and academic risk-taking eliminated the necessity for such analysis. Analyses of variance were conducted separately among boys, girls, and the total sample since observed differences were so large.

Originality. There was very slight variation in mean originality scores among risk-taking groups. These data are shown in Table 3.

TABLE 3
Originality: Means and Standard Deviations

Group	Boys		Girls		Total	
	Mean	SD	Mean	SD	Mean	SD
High Risk	48.9	9.6	48.6	9.2	48.2	9.4
Average Risk	45.7	7.9	47.0	9.8	46.5	9.0
Low Risk	48.3	9.0	47.3	9.1	47.8	9.1
N	143		148		291	

Analyses of variance resulted in non-significant F's among boys, girls, and the total sample. Source tables for originality are presented in Table 4.

TABLE 4

Source Table:
Originality X Academic Risk-taking

Group	Source	DF	MS	F
Boys	Total	142		
	Between	2	135.40	1.7
	Within	140	81.23	
Girls	Total	147		
	Between	2	28.50	0.3
	Within	145	90.06	
Total	Total	290		
	Between	2	131.75	1.5
	Within	288	85.07	

Fluency. Slight gains in mean fluency scores were observed as risk-taking propensity increased. Fluency means and standard deviations are reported in Table 5.

TABLE 5

Fluency: Means and Standard Deviations

Group	Boys		Girls		Total	
	Mean	SD	Mean	SD	Mean	SD
High Risk	51.4	8.2	52.6	8.5	51.9	8.4
Average Risk	51.1	8.5	50.8	8.8	50.9	8.7
Low Risk	49.6	9.2	50.8	8.0	50.2	8.6
N	143		148		291	

These differences, however, were not significant. Source tables for analyses of variance of fluency and academic risk-taking are shown in Table 6.

TABLE 6

Source Table:
Fluency X Academic Risk-taking

Group	Source	DF	MS	F
Boys	Total	142		
	Between	2	46.21	0.6
	Within	140	75.40	
Girls	Total	147		
	Between	2	48.81	0.7
	Within	145	72.88	
Total	Total	290		
	Between	2	68.21	0.9
	Within	288	73.60	

Flexibility. Mean flexibility scores varied to a small extent among risk-taking groups. These data are presented in Table 7.

TABLE 7

Flexibility: Means and Standard Deviations

Group	Boys		Girls		Total	
	Mean	SD	Mean	SD	Mean	SD
High Risk	56.2	13.6	57.3	14.9	56.7	14.2
Average Risk	53.8	10.4	56.9	14.0	55.5	12.6
Low Risk	57.5	13.0	56.1	13.4	56.7	13.3
N	143		148		291	

These differences, however, were not statistically significant. The source tables for flexibility and academic risk-taking are reported in Table 8.

TABLE 8

Source Table:
Flexibility X Academic Risk-taking

Group	Source	DF	MS	F
Boys	Total	142		
	Between	2	149.63	0.9
	Within	140	160.66	
Girls	Total	147		
	Between	2	20.53	0.1
	Within	145	200.55	
Total	Total	290		
	Between	2	45.31	0.3
	Within	288	180.12	

Elaboration. For boys, girls, and the total sample, mean elaboration scores rose directly with increasing risk-taking. The observed increases were very small. Mean elaboration scores and standard deviations are presented in Table 9.

TABLE 9

Elaboration: Means and Standard Deviations

Group	Boys		Girls		Total	
	Mean	SD	Mean	SD	Mean	SD
High Risk	50.8	12.7	52.7	11.9	51.6	12.4
Average Risk	49.8	13.7	52.7	13.3	51.3	13.6
Low Risk	49.6	9.1	40.1	10.5	49.9	9.9
N	143		148		291	

Analysis of variance indicated the differences to be non-significant. Source tables of elaboration data are reported in Table 10.

TABLE 10

Source Table:
Elaboration X Academic Risk-taking

Group	Source	DF	MS	F
Boys	Total	142		
	Between	2	22.06	0.1
	Within	140	149.61	
Girls	Total	147		
	Between	2	115.00	0.8
	Within	145	145.42	
Total	Total	290		
	Between	2	82.50	0.6
	Within	288	146.98	

Total creativity. Mean total creativity scores varied somewhat among risk-taking groups. Among girls, greater risk-takers scored somewhat higher in creative thinking ability than lower risk-takers. Differences among boys were erratic. Total creativity data are reported in Table 11.

TABLE 11

Total Creativity: Means

Group	Boys	Girls	Total
High Risk	207.4	211.2	208.9
Average Risk	200.5	207.1	204.1
Low Risk	204.9	204.2	204.5
N	143	148	291

Analyses of variance indicated no significant differences in creative thinking ability among the various risk-taking groups. In Table 12, source tables for creativity and academic risk-taking are

reported.

TABLE 12
Source Table:
Total Creativity X Academic Risk-taking

Group	Source	DF	MS	F
Boys	Total	142		
	Between	2	595.50	0.6
	Within	140	986.98	
Girls	Total	147		
	Between	2	558.00	0.5
	Within	145	1237.69	
Total	Total	290		
	Between	2	689.50	0.6
	Within	288	1107.94	

Discussion

The findings obtained in this investigation generally did not support the hypotheses that had been formulated by the researcher. It had been anticipated that significant relationships would be found between academic risk-taking and creativity. Thus, high risk-takers would have high originality, flexibility, and total creativity scores and low elaboration scores. Only for fluency and academic risk-taking was a non-significant relationship predicted. It had also been hypothesized that academic risk-taking would be higher for boys and would be related to general mental ability. Neither of these hypotheses were supported in this investigation.

In the light of such findings, it is important to re-examine the methods for measuring each trait. Although the creativity test battery has been generally accepted, its validity is still suspect; the scores provide evidence of the individual's ability to produce a quantity of different

figural ideas, but there is little empirical evidence to support the assumption that thinking processes, described as divergent and creative, entered into the production of these pictures. Moreover, risk-taking, delimited to academic risk-taking, may be a response set limited to the written test situation. The individual who in the classroom calls out answers frequently or quickly, who volunteers to try something new may not be the one who "gambles" on a test by answering as many questions as possible. Thus, the behavior studied may be representative of one facet of risk-taking or may be a characteristic unrelated to taking a chance.

CHAPTER V

Summary, Conclusions, and Recommendations

Summary

This investigation sought to determine the relationship between two personality characteristics, creativity and risk-taking, in fifth grade boys and girls between nine and eleven years of age. Creativity was explored by examining the factors of ideational fluency, spontaneous flexibility, originality, and elaboration. Risk-taking was studied in a classroom testing situation and was therefore regarded as academic in nature. The relationship between these two traits was investigated in terms of magnitude, direction, and differences between boys and girls. The research was directed toward answering six questions:

1. What was the relationship between creativity and academic risk-taking in fifth grade pupils?
2. What was the relationship between ideational fluency and academic risk-taking in fifth grade pupils?
3. What was the relationship between spontaneous flexibility and academic risk-taking in fifth grade pupils?
4. What was the relationship between originality and academic risk-taking in fifth grade pupils?
5. What was the relationship between elaboration and academic risk-taking in fifth grade pupils?
6. Was academic risk-taking a function of general mental ability and/or sex in fifth grade pupils?

The subjects of the study were 291 children in a middle class suburban community located in Westchester County. The materials included two standardized tests, the Torrance Tests of Creative Thinking, Figural,

Form A and the SRA Tests of General Ability (TOGA). The Wide Range Vocabulary Test by Atwell and Wells was adapted to yield an estimate of academic risk-taking. These instruments were administered during the school year 1968-1969.

Using analysis of variance, it was found that there was no significant relationship between academic risk-taking and sex or verbal ability. However, it was observed that boys were greater risk-takers than girls. As a result of these findings, analyses of variance were conducted in order to study the relationship of creativity and academic risk-taking for boys, girls, and the total sample.

It was found that there was no significant relationship between creative thinking ability and academic risk-taking among the fifth grade boys, girls, and the total sample. The results were similar for each of the creativity factors studied, elaboration, flexibility, fluency, and originality, as well as for the total creativity score. Variations that occurred between risk-taking groups were always slight. While obtained differences were generally in the direction of indicating that risk-takers were more creative than non-risk-takers, they failed to reach statistical significance and must be attributed to the operation of chance factors.

Conclusions

1. There is little relationship between creative thinking ability and the individual factors of ideational fluency, spontaneous flexibility, originality, and elaboration and academic risk-taking as measured in this study. Thus, children who guess and take chances are not necessarily more creative than children who do not exhibit this behavior.

2. As measured in this study, academic risk-taking is neither a function of sex nor general mental ability in fifth grade pupils, but is

unrelated to both.

Recommendations

1. Similar studies should be undertaken among other age groups in order to determine if age is a critical factor in the investigation of creativity and academic risk-taking.

2. Socio-economic class may be another factor relevant to the study of creativity and academic risk-taking. Further investigations should be carried out in the inner city as well as in more affluent suburbs.

3. The effect of anxiety on both creative thinking ability and academic risk-taking is largely unknown. Kogan and Wallach (1964) found that anxiety was critical in their study of risk-taking among adults. The addition of an instrument to measure anxiety appears likely to be advantageous in the study of creativity and academic risk-taking.

4. Although academic risk-taking did not appear related to creative thinking ability, there may still be a relationship between risk-taking in the out-of-school environment and creativity. Future investigations should therefore involve the measurement of risk-taking that is not academic in nature, but that is more relevant to the out-of-school environment.

BIBLIOGRAPHY

- Allen, A.J., Dacey, J.S., & Madaus, G.F. An analysis of two hypotheses concerning the relationship between creativity and intelligence. mimeographed. Boston College, 1969.
- Barron, F. Personality style and perceptual choice. Journal of Personality, 1952, 20, p. 385 - 401.
- Barron, F. The disposition toward originality. In C.W. Taylor & F. Barron (Eds.), Scientific creativity: Its recognition and development. New York: John Wiley, 1963a, p. 153 - 160.
- Barron, F. Creativity and psychological health. Princeton, New Jersey: Van Nostrand, 1963b.
- Bartlett, F. Thinking. New York: Basic Books, 1958.
- Bruner, J.S. The process of education. Cambridge, Massachusetts: Harvard University Press, 1960.
- Buros, O.K. (Ed.). Sixth mental measurements yearbook. Highland Park, New Jersey: Gryphon Press, 1965. p. 774.
- Colvin, S.S. Invention versus form in English composition: An indicative study. Pedagogic Seminars, 1902, 9, p. 393 - 444. (J.W. Getzels & P. W. Jackson. Creativity and intelligence. New York: Wiley, 1962.)
- Cronbach, L.J. Response sets and test validity. Educational and Psychological Measurement, 1946, 6, p. 475 - 494.
- Crutchfield, R.S. Conformity and creative thinking. In H.S. Gruber, G. Terrell, & M. Wertheimer (Eds.), Contemporary approaches to creative thinking. New York: Atherton Press, 1962. p. 120 - 140.
- Eisner, E.W. Research in creativity: Some findings and comparisons. Childhood Education, 1963, 39, p. 371 - 375.
- Fleming, E.S. & Weintraub, S. Attitudinal rigidity as a measure of creativity in gifted children. Journal of Educational Psychology, 1962, 53, p. 81 - 86.
- Gaier, E.L. Creativity, intelligence, and achievement in motor skills. In R.L. Mooney & T.A. Razik (Eds.), Explorations in creativity. New York: Harper & Row, 1967. p. 239 - 245.
- Getzels, J.W. & Jackson, P.W. Creativity and intelligence. New York: Wiley, 1962.
- Golann, S.F. Psychological study of creativity. Psychological Bulletin, 1963, 60, p. 548 - 565.
- Guilford, J.P. Creativity. American Psychologist, 1950, 5, p. 444 - 454.

- Guilford, J.P. A revised structure of intellect. University of Southern California Laboratory Report, 1957, No. 19.
- Guilford, J.P. Traits of creativity. In H.H. Anderson (Ed.). Creativity and its cultivation. New York: Harper, 1959. p. 83 - 95.
- Guilford, J.P. Intellectual factors in productive thinking. In R.L. Mooney & T.A. Razik (Eds.). Explorations in creativity. New York: Harper & Row, 1967a. p. 95 - 106.
- Guilford, J.P. Measurement of creativity. In R.L. Mooney & T.A. Razik (Eds.). Explorations in creativity. New York: Harper & Row, 1967b. p. 281 - 287.
- Holland, J.L. Test reviews. Journal of Counseling Psychology, 1968, 15, p. 297 - 298.
- Horrocks, J.E. SPA Tests of General Ability. In O.K. Buros (Ed.). Sixth mental measurements yearbook. Highland Park, New Jersey: Gryphon Press, 1965. p. 774 - 776.
- Jackson, P.W. & Messick, S. The person, the product, and the response: Conceptual problems in the assessment of creativity. Journal of Personality, 1965, 33, p. 309 - 329.
- Kass, N. Risk in decision making as a function of age, sex, and probability preference. Child Development, 1964, 35, p. 578 - 582.
- Kogan, H. & Wallach, M.A. Risk-taking: A study in cognition and personality. New York: Holt, Rinehart & Winston, 1964.
- Kubie, L.S. Blocks to creativity. In R.L. Mooney & T.A. Razik (Eds.). Explorations in creativity. New York: Harper & Row, 1967. p. 33 - 42.
- Kurtzman, K.A. A study of school attitudes, peer acceptance, and personality of creative adolescents. Exceptional Children, 1967, 34, p. 157 - 162.
- Long, B.H. & Henderson, E.H. Opinion formation and creativity in elementary school children. Psychological Reports, 1965, 17, p. 219 - 223.
- MacKinnon, D.W. The nature and nurture of creative talent. American Psychologist, 1962, 17, p. 484 - 495.
- MacKinnon, D.W. Identifying and developing creativity. In J.C. Gowan, G.D. Demos, & E.P. Torrance (Eds.). Creativity: Its educational implications. New York: John Wiley, 1967. p. 227 - 235.
- Maslow, A.H. Defense and growth. Merrill-Falmer Quarterly, 1956, 3, p. 17 - 38.
- McLelland, D.C. The calculated risk: An aspect of scientific performance. In C.W. Taylor & F. Farron (Eds.). Scientific creativity: Its recognition and development. New York: Wiley, 1963. p. 184 - 192.

McNemar, Q. Lost; Our intelligence? Why? American Psychologist, 1964, 19, p. 871 - 882.

Mednick, S.A. The associative basis of the creative process. Psychological Review, 1962, 69, p. 220 - 232.

Merrifield, P.R., Guilford, J.P., Christensen, P.R., & Frick, J.W. Interrelationships between certain abilities and certain traits of motivation and temperament. Journal of General Psychology, 1961, 65, p. 57 - 74.

Messick, S. & Hills, J.R. Objective measurement of personality: Cautiousness and intolerance of ambiguity. Educational and Psychological Measurement, 1960, 20, p. 685 - 698.

Mooney, R.L. A conceptual model for integrating four approaches to the identification of creative talent. In S.J. Parnes & H.F. Hardig (Eds.), A source book for creative thinking. New York: Scribners, 1962, p. 73 - 84.

Nicolay, G.C. Relationship between a risk-taking questionnaire and selected personality characteristics. (Doctoral dissertation, Fordham University) Ann Arbor, Michigan: University Microfilms, 1966. No. 66-2142.

Chrmacht, F.W. A note on indices of creativity. Perceptual & Motor Skills, 1966, 22, p. 370.

Pankove, E.W. The relationship between creativity and risk-taking in fifth grade children. (Doctoral dissertation, Princeton University) Ann Arbor, Michigan: University Microfilms, 1967. No. 67-1309.

Pankove, E. & Kogan, N. Creative ability and risk-taking in elementary school children. Journal of Personality, 1968, 36, p. 420 - 449.

Paulus, D.H. & Renzulli, J. Scoring creativity tests by computer. Paper presented at the meeting of the ERANYS, Kiamesha Lake, New York, November, 1968.

Piers, E.V., Daniels, J.M., & Quackenbush, J.F. Identification of creativity in adolescents. Journal of Educational Psychology, 1960, 51, p. 346 - 351.

Price, B.M. & Bell, B.G. The relationship of chronological age, mental age, IQ, and sex to divergent thinking test. Journal of Psychological Researches, 1965, 9, p. 1 - 9.

Ripple, R.E. & May, F.B. Caution in comparing creativity and IQ. Psychological Reports, 1962, 10, p. 229 - 230.

Rogers, C.R. Toward a theory of creativity. In H.H. Anderson (Ed.), Creativity and its cultivation. New York: Harper, 1959. p. 69 - 82.

- 46
- Schafer, R. Regression in the service of the ego. In G. Lindzey (Ed.), Assessment of human motives. New York: Rinehart & Co., 1958. p. 117 - 148.
- Schutz, R.E. SRA Tests of General Ability. In O.K. Buros (Ed.), Sixth mental measurements yearbook. Highland Park, New Jersey: Gryphon Press, 1965. p. 776 - 777.
- Scodel, A., Ratoosh, P., & Minas, J.S. Some personality correlates of decision making under conditions of risk. Behavioral Science, 1959, 4, p. 19 - 28.
- Siegel, L. Test reviews. Journal of Counseling Psychology, 1961, 8, p. 91 - 92.
- Simpson, R.M. Creative imagination. American Journal of Psychology, 1922, 33, p. 234 - 235.
- Slakter, M.J. Risk taking on objective examinations. American Educational Research Journal. 1967, 4, p. 31 - 43.
- Slakter, M.J. Generality of risk taking on objective examinations. Educational and Psychological Measurement, 1969, 29, p. 115 - 128.
- Slakter, M.J. & Koehler, R.A. A new measure of risk taking on objective examinations. California Journal of Educational Research, 1968, 19, p. 132 - 137.
- Slovic, P. Convergent validation of risk taking measures. Journal of Abnormal and Social Psychology, 1962, 65, p. 68 - 70.
- Slovic, P. Risk-taking in children: Age and sex differences. Child Development, 1966, 37, p. 169 - 176.
- Stein, M.I. Creativity and culture. Journal of Psychology, 1953, 36, p. 311 - 322.
- Stein, M.I. Creativity as an intra- and inter-personal process. In S.J. Farnes & H.F. Hardig (Eds.), A source book for creative thinking. New York: Scribners, 1962, p. 86 - 92.
- Steinberg, L. Creativity as a character trait: An expanding concept. In J.C. Gowan, G.D. Demos, & E.P. Torrance (Eds.), Creativity: Its educational implications. New York: John Wiley, 1967. p. 124 - 136.
- Stone, L.A. Reliability of a utility of risk measure. Psychological Reports, 1962, 10, p. 516.
- Winneford, F. The measurement of a personality trait. Journal of Educational Psychology, 1938, 29, p. 295 - 300.
- Winneford, F. Analysis of a personality trait. Journal of Educational Psychology, 1941, 32, p. 438 - 444.

- Taylor, C.W. Introduction. In C.W. Taylor (Ed.). Creativity: Progress and potential. New York: McGraw-Hill, 1964a. p. 1 - 14.
- Taylor, C.W. Some knowns, needs, and leads. In C.W. Taylor (Ed.). Creativity: Progress and potential. New York: McGraw-Hill 1964b. p. 178 - 185.
- Taylor, C.W. & Holland, J.L. Development and application of tests of creativity. Review of Educational Research, 1962, 32, p. 91 - 102.
- Thurstone, L.L. Primary mental abilities. Psychometric Monograph, No. 1, 1938.
- Torrance, E.P. Guiding creative talent. Englewood Cliffs, New Jersey: Prentice Hall, 1962.
- Torrance, E.P. Education and creativity. In C.W. Taylor (Ed.). Creativity: Progress and potential. New York: McGraw-Hill, 1964. p. 49 - 128.
- Torrance, E.P. Rewarding creative behavior. Englewood Cliffs, New Jersey: Prentice Hall, 1965.
- Torrance, E.P. Torrance tests of creative thinking: Directions manual and scoring guide. Princeton, New Jersey: Personnel Press, 1966a.
- Torrance, E.P. Torrance tests of creative thinking: Norms-technical manual, research edition. Princeton, New Jersey: Personnel Press, 1966b.
- Torrance, E.P. The Minnesota studies of creative behavior: National and international extensions. Journal of Creative Behavior, 1967, 1, p. 137 - 154.
- Torrance, E.P. Examples and rationales of test tasks for assessing creative abilities. Journal of Creative Behavior, 1968, 2, p. 167 - 178.
- Veldman, D.J. Fortran programming for the behavioral sciences. New York: Holt, Rinehart & Winston, 1967.
- Wallach, M.A. & Caron, A.J. Attribute criteriality and sex-linked conservatism as determinants of psychological similarity. Journal of Abnormal and Social Psychology, 1959, 59, p. 43 - 50.
- Wallach, M.A. & Kogan, N. A new look at the creativity-intelligence distinction. Journal of Personality, 1965, 33, p. 348 - 369.
- Ward, W.C. Creativity in young children. Child Development, 1968, 39, p. 737 - 754.
- Weisberg, G. & Springer, L. Environmental factors in creative function. Archives of General Psychiatry, 1961, 5, p. 554 - 564.

- Winer, B.J. Statistical principles in experimental design. New York: McGraw-Hill, 1962.
- Wodtke, K.H. Some data on the reliability and validity of creativity tests at the elementary school level. Educational and Psychological Measurement, 1964, 24, p. 399 - 408.
- Yamamoto, K. & Genovese, C.T. Creativity and norm conformity in fifth grade children. Exceptional Children, 1965, 32, p. 257 - 258.
- Ziller, R.C. Vocational choice and utility for risk. Journal of Counseling Psychology, 1957, 4, p. 61 - 64.

THE RELATIONSHIP OF CREATIVITY AND
ACADEMIC RISK-TAKING AMONG FIFTH GRADERS

This investigation sought to determine the relationship between two personality characteristics, creativity and risk-taking, in fifth grade boys and girls between nine and eleven years of age. Creativity was explored by examining the factors of ideational fluency, spontaneous flexibility, originality, and elaboration. Risk-taking was studied in a classroom testing situation and is therefore regarded as academic in nature. The relationship between these two traits was investigated in terms of magnitude, direction, and differences between boys and girls.

The subjects of the study were 291 children in a middle class suburban community located in Westchester County. The materials included two standardized tests, The Torrance Tests of Creative Thinking, Figural, Form A and the SRA Tests of General Ability (TOGA). The Wide Range Vocabulary Test by Atwell and Wells was adapted to yield an estimate of academic risk-taking. These instruments were administered during the school year 1968 - 1969.

Using analysis of variance, it was found that there was no significant relationship between academic risk-taking and sex or verbal ability. However, it was observed that boys were greater risk-takers than girls. As a result of these findings, analyses of variance were conducted in order to study the relationships of creativity and academic risk-taking for boys, girls, and the total sample.

It was found that there was no significant relationship between creative thinking ability and academic risk-taking among fifth grade boys, girls, and the total sample. The results were similar for each of the creativity factors studied, elaboration, flexibility, fluency, and originality as well as for the total creativity score. Variations that

occurred between risk-taking groups were always slight. While obtained⁵⁰ differences were generally in the direction of indicating that risk-takers were more creative than non-risk-takers, they failed to reach statistical significance and must be attributed to the operation of chance factors.